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GEOMETRY.

343. Proposed by O. J. BROWN, Fairhope, Ala.

From any external point of a triangle, to draw a line so as to divide the triangle into two equal parts.

344. Proposed by C. N. SCHMALL, 604 East 5th Street, New York.

A tinsmith has a sheet of copper in the form of a rectangle, sides a and b. He desires to cut this into two pieces which will form a square when placed together. How can he do this?

CALCULUS.

171. Proposed by E. B. ESCOTT, Ann Arbor, Mich.

In the differential equation

$$\left(\frac{d^2y}{dx^2}\right)^2\frac{d^5y}{dx^5}-5\left(\frac{d^2y}{dx^2}\right)\frac{d^3y}{dx^3}\cdot\frac{d^4y}{dx^4}+\tfrac{40}{9}\left(\frac{d^3y}{dx^3}\right)^3=0,$$

show that there is an integrating factor of the form $\left(\frac{d^2y}{dx^2}\right)^n$, and integrate the equation.

172. Proposed by CLARENCE OHLENDORF, Chicago, Ill.

Find $\int \log_e \tan^{-1} x\,dx$.

NUMBER THEORY AND DIOPHANTINE ANALYSIS.

160. Proposed by H. S. VANDIVER, Bala, Pa.

Prove that the integer next above $(\sqrt{3}+1)^{2n}$ is divisible by 2^{n+1}.

161. Proposed by R. D. CARMICHAEL, Anniston, Ala.

Find a solution of $x^4-5x^2+4\equiv 0 \pmod{p.\overline{2p+1}}$, where both p and $2p+1$ are odd primes.

162. Proposed by L. E. DICKSON, Ph. D., Associate Professor of Mathematics, The University of Chicago.

If p is an odd prime, find the number of incongruent integers x for which x^4+2ex^2+f is a quadratic residue of p.

MISCELLANEOUS.

181. Proposed by A. H. HOLMES, Brunswick, Me.

In latitude 43° 45′ N., the sun's declination being 16° 30′ N., at what time in the forenoon will the angle on the horizon between the east point and the foot of the meridian passing through the sun's position be equal to its altitude?